



# DEPARTMENT OF THE NAVY

NAVAL AIR SYSTEMS COMMAND  
NAVAL AIR SYSTEMS COMMAND HEADQUARTERS  
WASHINGTON, DC 20361 -0001

IN REPLY REFER TO

NAVAIRINST 3900.7C  
AIR-5512  
19 Nov 90

## NAVAIR INSTRUCTION 3900.7C

From: Commander, Naval Air Systems Command

Subj: SHOCK HARDENING PROGRAM FOR SHIPBOARD GOVERNMENT FURNISHED ITEMS AND EQUIPMENT

Ref: (a) OPNAVINST 9072.2, Shock Hardening of Surface Ships (NOTAL)  
(b) MILITARY SPECIFICATION, MIL-S-901, Shock Tests, H.I. (High Impact) Shipboard Machinery, Equipment, and Systems, Requirements For (NOTAL)  
(c) CONFIDENTIAL Design Data Sheet DDS 072-1 of 15 Sep 90, Shock Design Values (U) (NOTAL)

Encl: (1) Waiver Request Format  
(2) Deviation Request Format

1. Purpose. This instruction establishes requirements and implements shock hardening policy contained in reference (a) applicable to Government Furnished Equipment (GFE) and GFE components under Naval Air Systems Command (NAVAIR) cognizance.

2. Cancellation. This instruction supersedes NAVAIRINST 3900.7B of 27 April 1978. Since this is a major revision, changes have not been indicated.

3. Scope. This instruction applies to GFE provided for shipbuilder or shipyard installation, and to all GFE intended for use, installation, or stowage aboard naval ships, including spare and repair parts, subject to the following:

a. The shock hardening requirements are applicable to items under NAVAIR cognizance which are required for performance or direct and vital support of the following ship functions:

- (1) Command-and-Control.
- (2) Navigation.
- (3) Communication.
- (4) Surface and air surveillance.
- (5) Countermeasures.
- (6) Launching, retrieving, fueling, defueling, rearming, and handling of aircraft.
- (7) Essential checkout and maintenance of aircraft.
- (8) Stowage, handling, and reloading of weapons.
- (9) Replenishment at Sea.



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(10) Transporting and Landing Troops and Combat Payload (Assault Ships).

(11) Other capabilities as deemed necessary for the specific ship class by the Chief of Naval Operations.

b. Applicability of these requirements will be determined on a case basis for items whose sole application will be limited to air cushion vehicles, hydrofoils, surface effect ships, small boats, and similar craft.

c. These requirements apply to new procurements and repro procurements. In cases where it is impracticable to satisfy these requirements, a waiver or deviation will be requested (see paragraph 8).

d. Expendable ordnance will satisfy shock requirements while in the stowed configuration and will be capable of performing its intended function after launch. Weapon handling and loading equipment will meet shock hardening requirements in both the stowed and operating configurations.

e. The fact that this instruction does not require shock hardening of GFE under certain circumstances does not relieve the procuring activity of its responsibility to satisfy shock hardening requirements as may be invoked by other applicable directives.

4. Policy. All applicable NAVAIR items will be classified for shock grade. Grade A and B items will be designed and tested and/or analyzed to shock hardening requirements. In the event that shock testing/analysis is impracticable prior to ship installation or stowage, a request for waiver or deferral will be expeditiously submitted to prevent unnecessary procurement delays. Shock hardening waivers, deviations, and deferrals should be addressed at Procurement Planning Conferences to alert the procurement community of potential delays. The Naval Air Systems Command Headquarters (NAVAIRHQ) will, within the limits of available funds, support efforts required for the acquisition of shock-resistant equipment and improvement of shock-deficient items.

#### 5. Shock Grade Classifications

a. Grade A items are machinery, equipment, and systems essential for the safety and continued combat capability of the ship.

b. Grade B items are machinery, equipment, and systems not required for the safety or continued combat capability of the ship.

c. Other. Any item which does not fall into either Grade A or B classification has no shock hardening requirements. They are similar to Grade B items except they are located where they cannot become a hazard to Grade A items or personnel.

6. Criteria. Applicable items will demonstrate compliance with shock hardening requirements as follows:

a. Items whose size and weight permit shock testing per reference (b) will satisfy the shock test requirements contained therein. For items whose application is restricted to aircraft carriers and located on the main deck and above, the shock test energy level may be reduced by one half. Grade A items will be capable of performing mission essential functions during and after testing. Grade B items need not operate during or after the shock. Grades A and B items will not come adrift or otherwise create a hazard during or after shock testing.

b. Items which cannot be shock tested will be designed to withstand shock loadings. These loadings will be established on the basis of dynamic analysis using the shock design values of reference (c).

7. Installation Interface. The capability of items to withstand shock aboard ship is dependent not only upon shock hardening actions taken by the procuring activity, but also upon Naval Sea Systems Command (NAVSEASYS COM) cognizant design and arrangement of shipboard stowage systems, foundations, or other supporting structure. The procuring activity will coordinate development of interface shock requirements with NAVSEASYS COM as necessary to achieve total system shock resistance.

8. Waiver of and Deviation from Shock Hardening Requirements. Waivers apply to items for which shock hardening and qualification requirements have been deleted, omitted, or reduced. Deviations apply to items that will be, or have been, shock qualified to standards other than those specified in reference (b), yet which fulfill the technical intent of that requirement. Deviation from the provisions of this instruction requires approval of NAVSEASYS COM. Request for waiver of shock hardening criteria or deferral of shock hardening qualification tests will be submitted to NAVSEASYS COM via the NAVAIR Shock Hardening Coordinator (AIR-551). Waivers for items destined for new construction ships should be forwarded to the appropriate Ship Acquisition Program Manager (PMS). Waivers for items destined for operational ships should be sent to the appropriate Ship Logistics Manager. NAVSEASYS COM (SEA-55X1) is the approving authority for deviations. The waiver request will be in the enclosure (1) format and may address a family of equipment, if applicable. Deviation requests will be in the enclosure (2) format.

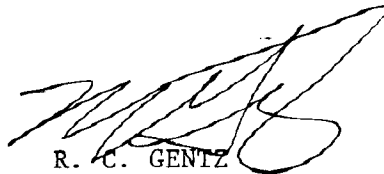
9. Action

a. The Director, Ship and Shore Installations Division (AIR-551), is designated the NAVAIR Shock Hardening Coordinator and as such is responsible for determining NAVAIR policy relating to shock and approving shock grade classifications.

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b. Each project officer, cognizant engineer, field activity, and/or inventory control point involved in the procurement of NAVAIR weapons, machinery, equipment, and systems will budget and program for shock hardening requirements and take other appropriate action to implement paragraphs 5, 6, 7, and 8 above. Shock grade classification recommendations and waiver requests, when required, will be initiated by the cognizant hardware manager.

c. Addressees will include NAVAIRHQ (AIR-551) for a copy on all correspondence pertaining to this program.



R. C. GENTZ

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WAIVER REQUEST FORMAT

From: (Originating Office)  
To: Commander, Naval Sea Systems Command (PMS-XXX or Life Cycle Mgr)  
Via: Commander, Naval Air Systems Command (AIR-551)

Subj: REQUEST FOR WAIVER OF SHOCK HARDENING REQUIREMENTS

1. Description of Item: (Identify the item including size, weight, mounting or stowage arrangement, nomenclature, common name, and basic function with respect to ship mission.)
2. Acquisition Status: (Provide the status of the current development or procurement program responsible for developing or acquiring the item. Identify planned actions and schedules for shock qualification of the item or system.)
3. Acquisition Manager: (Identify the Navy office responsible for the item.)
4. Scope: (Identify the number of items covered by the waiver, the specific ships affected, and future ships/ship classes that may be affected by waiver approval.)
5. Rationale: (Provide concise pro and con analytical arguments with conclusions. Emphasize the impact on the ability of the ship to continue the mission that the equipment supports, both short and long term. Identify known shock deficiencies if applicable.)

Copy to:  
COMNAVSEASYS COM (SEA-55X13)

NOTES:

1. It is advisable to contact the shock hardening coordinator prior to submission of the waiver request to make certain of the requirement for the waiver and to discuss possible alternatives.
2. Where appropriate, a single waiver request may be submitted to cover a category or family of functionally similar items.

Encl (1)

*5*  
*6/1/91*

DEVIATION REQUEST FORMAT

From: (Originating Office)  
To: Commander, Naval Sea Systems Command (SEA-55X)  
Via: Commander, Naval Air Systems Command (AIR-551)

Subj: REQUEST FOR DEVIATION OF SHOCK HARDENING REQUIREMENTS

1. Item Description: (Identify the item, including size, weight, mounting, nomenclature, common name and basic functions.)
2. Deviation Detail: (Compare the shock qualification procedure that was/will be used and the U. S. Navy standard procedures described in reference (c).)
3. Rationale: (Provide convincing narrative that explains the reasons why the non-standard procedure provides equal or better shock survivability assurance than the standard procedure.)
4. Justification: (Explain why the standard procedures were not/cannot be used.)